

Providing animal technicians with the latest news from the NC3Rs

Tech3Rs

Welcome to the latest edition of Tech3Rs. In each issue, we share updates on recent advances in the 3Rs and highlight new resources, research and events.

This newsletter is for animal technicians working in research establishments to help identify opportunities to embed the 3Rs in practice and ensure high standards of animal welfare. If you have any ideas for future issues or are working on a 3Rs approach you would like us to feature, please get in touch – we would love to hear from you! You can email us at tech3rs@nc3rs.org.uk.

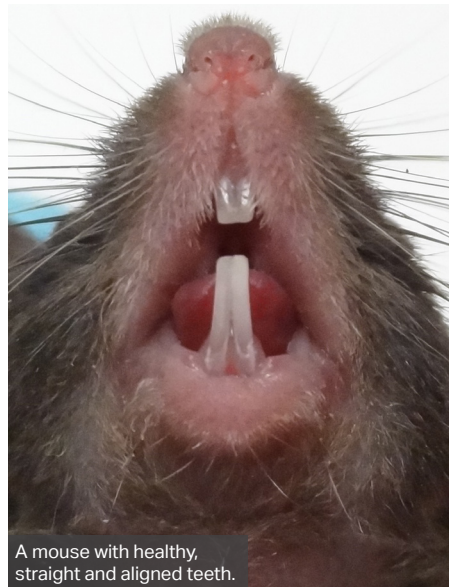
In this issue we introduce our new online resource on malocclusion in mice and summarise papers that look at hypothermia in rodents during anaesthesia. We also highlight our updated page on the housing and husbandry of hamsters and speak to Robin Labesse, Manager of the Biomedical Research Facility at the University of Surrey, about his career so far.



Don't miss the next issue!

Tech3Rs is currently published online only – read all our past issues at www.nc3rs.org.uk/tech3rs.

You can stay up-to-date on the latest issue of Tech3Rs and more via the NC3Rs e-newsletter. Visit www.nc3rs.org.uk/register to subscribe to our monthly updates.



A mouse with healthy, straight and aligned teeth.



A mouse with malocclusion, i.e. misaligned and overgrown teeth.

Malocclusion in mice: spot the signs and take action

We have collaborated with experts to create a new online educational resource on malocclusion in laboratory mice.

Malocclusion is a dental disorder that is relatively common in laboratory mice and is characterised by improper alignment of the teeth. The teeth of rodents grow continually throughout their lifetimes and need to be worn down to prevent overgrowth. When the teeth are properly aligned, wear occurs naturally as the animals eat and gnaw. When malocclusion is present, the teeth are not properly aligned, which poses a significant welfare concern. If malocclusion is not addressed in the early stages, the teeth will become overgrown, preventing the animal from getting adequate nutrition and hydration.

It is important that everyone who works with laboratory mice is aware of malocclusion as a serious health concern and is informed about the risk

factors, the indicators and what action to take if malocclusion is suspected or evident. With input from expert contributors and reviewers, we have created an online resource that covers all of these areas. The content includes a recorded presentation and downloadable presentation slides that you can use to learn more about malocclusion yourself, or to train a larger audience on this topic. We have also created a poster, designed to be professionally printed and displayed in your facility, as a reminder to check the teeth of mice for any signs of malocclusion and address the issue before it becomes severe.

Learn more about how to minimise the risk of malocclusion-related suffering by visiting the resource at www.nc3rs.org.uk/malocclusion.

3Rs papers of interest

Each issue we feature recent 3Rs papers, providing summaries and links to the full articles for further reading. This issue we look at hypothermia in rodents following anaesthesia and its implications for animal welfare, as well as ways to prevent it.



Hypothermia during general anaesthesia interferes with pain assessment in laboratory rats (*Rattus norvegicus*)

- General anaesthesia is often used in procedures to minimise pain. However, because it suppresses body temperature regulation it can result in hypothermia.
- This study explored whether hypothermia could interfere with accurate pain assessment using the Rat Grimace Scale (RGS), a quantitative approach for assessing pain based on facial expressions.
- Sprague-Dawley rats anaesthetised with isoflurane for 30 minutes were either warmed with an electric heating pad or left unwarmed during anaesthesia and recovery periods.
- RGS scores for both groups were recorded before anaesthesia (baseline) and at four timepoints in the first three hours after recovery from anaesthesia.
- The RGS scores of unwarmed rats were significantly higher (i.e. increased signs of pain) than baseline levels for three hours after anaesthesia. They were also higher than the RGS scores of warmed rats at five and 180 minutes after anaesthesia.
- These findings show that hypothermia induced by isoflurane can affect accurate RGS scoring. It is therefore important to maintain normal body temperature during anaesthesia and recovery in order to accurately assess post-operative pain.

Klune CB et al. (2020). *Journal of the American Association for Laboratory Animal Science* 59(6): 719-725. doi: [10.30802/AALAS-JAALAS-20-000018](https://doi.org/10.30802/AALAS-JAALAS-20-000018).



Prewarming followed by active warming is superior to passive warming in preventing hypothermia for short procedures in adult rats (*Rattus norvegicus*) under isoflurane anaesthesia

- This study looked at how different ways of warming can affect the body temperature of rats that have been anaesthetised with isoflurane.
- Awake Sprague-Dawley rats underwent prewarming in a warming box to increase core temperature by 1%, as a strategy to delay hypothermia during anaesthesia. Following prewarming, they were anaesthetised with isoflurane and either passively warmed using a fleece blanket or actively warmed using a temperature-controlled heating pad, each for 30 minutes.
- They were then allowed to recover, while continuing to be warmed with the chosen method for another 30 minutes. Their core temperature was continuously monitored using a telemetric device.
- Active warming resulted in higher core temperatures during anaesthesia, while passive warming resulted in hypothermia after approximately 30 minutes of anaesthesia and continued into recovery.
- Overall, this study showed that active warming using a heating pad should be chosen over passive warming to prevent hypothermia in rats during both anaesthesia and recovery.

Rufiange M et al. (2020). *Journal of the American Association for Laboratory Animal Science* 59(4): 377-83. doi: [10.30802/AALAS-JAALAS-19-000114](https://doi.org/10.30802/AALAS-JAALAS-19-000114).



Effects of cling film draping material on body temperature of mice during surgery

- As well as affecting animal welfare, hypothermia can adversely affect surgical outcomes. This study explored whether different draping materials used to cover mice during surgery, could offer thermal support during anaesthesia.
- C57BL/6 mice were anaesthetised with isoflurane and either covered with cling film or a paper drape, or not covered at all. Their rectal and surface temperature was measured every five minutes for the duration of a 35-minute sham surgery session that involved all procedures included in standard surgery, i.e. hair clipping, skin sterilisation and skin incision.
- The results showed that cling film-draped animals had significantly higher rectal temperatures than non-draped animals. In addition, surface temperatures of cling film-draped mice were considerably higher than those of both paper-draped and undraped animals.
- The authors conclude that cling film is an effective material to help minimise hypothermia in mice and hence improve surgical outcomes.

Celeste NA et al. (2021). *Journal of the American Association for Laboratory Animal Science* 60(2): 195-200. doi: [10.30802/AALAS-JAALAS-20-000089](https://doi.org/10.30802/AALAS-JAALAS-20-000089).



Highlights from the NC3Rs website

Updated page on hamster housing and husbandry

Hamsters are burrow-digging, nest-building rodents that are sensitive to seasonal changes within their surroundings. We have now updated our housing and husbandry pages to include more information on hamsters, and how to meet their needs in a research environment.

Did you know that hamsters are solitary in the wild, but can be socially housed if this is approached correctly? Would you know how to tell the difference between a hamster that is unwell and one in a state of torpor? The updated page includes information on these topics and more, including environmental enrichment and sensory capabilities.

Visit the updated page at www.nc3rs.org.uk/hamsterhousing.



Webinar recording: Environmental monitoring for rodent health surveillance

Traditionally, sentinel animals have been used for health surveillance of rodent colonies. Many institutions are now replacing or reducing the use of sentinel animals with a combination of molecular-based diagnostics and environmental monitoring strategies. Environmental monitoring can also improve the detection of pathogens and the accuracy of results, while reducing workload and costs.

If you missed this NC3Rs and NA3RsC webinar, you can still learn more about the practicalities of implementing environmental monitoring for both rack-level filtration systems and cage-level options by watching the recording, which features Dr Kerith Luchins (University of Chicago) and Dr Megan LaFollette (NA3RsC).

View the webinar recording at www.nc3rs.org.uk/environmentalmonitoring.



Webinar recording: Best practice in colony management

The COVID-19 pandemic disrupted the breeding of genetically altered mice. This resulted in a number of challenges when restarting research work, such as how to breed experimental cohorts from colonies that have been significantly reduced in size.

Join Dr Ellen Forty (NC3Rs) in this webinar recording, as she discusses expert recommendations for best practice in efficient colony management post-lockdown. Examples of ways to implement best practice are highlighted, including the use of intermittent breeding strategies and the archiving of lines. The latest guidance in this area is also summarised.

View the webinar recording at www.nc3rs.org.uk/colonymanagementwebinar.



Change is coming: we are updating our website

Keep your eyes peeled for the new-look NC3Rs website, which is coming soon. In addition to a fresh design, we have made improvements to how you access the content that is most useful for you. Once the migration to our new website is

complete, you will be able to filter content by your job role, the species or model you are interested in, and many other useful categories. This will help you find the information you need most as quickly as possible when you visit us online.



Sign up to our newsletter or follow us on Twitter (www.twitter.com/nc3rs) or LinkedIn (www.nc3rs.org.uk/linkedin) to be the first to hear when our new website is live.

Tech Journeys

We speak to inspirational technicians who have demonstrated a long-term commitment to the 3Rs about their career paths. If you have an inspirational story, or know someone else who does, please get in touch via tech3rs@nc3rs.org.uk.

This issue we are featuring Robin Labesse, Manager of the Biomedical Research Facility at the University of Surrey, who talks about his career in animal technology, experiencing compassion fatigue, and championing the 3Rs while supporting other animal technicians to do the same.

I grew up around animals; there were a lot of dogs in my family and I had various small pets in my house. For years, my closest neighbours were a herd of cows. Despite a strong bond with animals, I never expected to work with them as a career. I became an animal technician almost by accident.

I started working with animals during my first job, at the University of Montpellier in France, as a scientific technician. I looked after sea bass, sea bream, two totem lobsters and occasionally eels. It was humbling and empowering to have sole responsibility for those animals being healthy. This experience made me realise that I could never know too much in this line of work. Looking after animals, especially in research, is such a responsibility that you need to be the best you can, which requires constant learning.



Learning throughout your career as a technician

Learning came in two ways for me: learning from others and learning by myself. I would encourage every technician to be proactive in their learning journey. Your line manager will recommend courses for you, and you should follow their advice; but do not stop there – go find out more for yourself! Read, network, ask questions; it will

always pay off. You never reach a stage in your career when you know everything. There is always more to learn, which keeps things interesting.

While working with fish, I completed the French equivalent of the French equivalent of the PIL A, B and C courses, which tend to focus more on rodents rather than fish. This gave me the insight that I might like to work with mice. Shortly after that I applied for an animal technician role in Paris, caring for animals used in neurological research.

We had rats that could learn complex sequences of buttons to push as part of their Huntington's programme, canaries and lovebirds used in language research, guinea pigs, *Xenopus*, and thousands of mice. Whilst the mice were my responsibility, I still was lucky enough to interact with the other animals on occasions.

Looking after your mental health

This was a busy breeding unit, and after some months, I started to feel down about my work; I was paying the cost of caring. At the time I did not know about compassion fatigue and just decided to take a step away from animal research. Compassion fatigue is real, and there is no shame in it. For anyone reading this, remember: it is OK not to be OK, and help is available.

After a few months of reflection, life gave me the opportunity to move to London to work as an animal technician at Cancer Research UK. This is when I fully committed myself to this career.

Later I moved to the MRC Prion Unit. I learnt a lot there, obtained my PIL, was involved in surgeries, became a senior technician, and oversaw experiments on behalf of the scientists. I was also lucky to take part in a Home Office



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project to review retrospective severity assessment. This is where I fully started my 3Rs journey, by realising that as a technician I could have a voice.

Getting involved in research

During my time at the MRC Prion Unit, I was able to take on a few research trials. One involved investigating non-invasive methods of genotyping to replace traditional ones wherever possible, with the support of the researchers. I was awarded the first ever MRC Prion Unit 3Rs award for this work.

I became a NACWO and 3Rs champion around that time, and I was able to support other technicians to become involved with the 3Rs. I firmly believe that technicians should be given the opportunity to explore ways to improve animal welfare and be offered the support they need to scientifically validate their ideas, for example through appropriately designed experimental studies.

Animal technicians will often go above and beyond to enhance the quality of life of the animals in their care. This is great and should be encouraged. My team at the University of Surrey is currently working on a number of welfare projects, including assessing preferred scent to encourage gnawing of wooden blocks in mice and exploring enrichment rotation as a way to maintain some novelty in the cages and keep the animals interested and engaged with the enrichment items provided. I have also worked closely with my team in order to implement refined mouse handling and reduce needle re-use with the aim of achieving 99% single use needles soon.



Outside of work, Robin enjoys hiking – he has previously taken on the West Highland Highway (l) and Snowdon (r).

Sharing 3Rs ideas

I have always been passionate about sharing 3Rs ideas with my peers. As a technician, exchanging ideas should be a way of life and it never stops; managers do it all the time too. However, everyone is busy and sometimes it takes a little nudge to turn 3Rs ideas into practice. Therefore, I have always been involved in creating events to disseminate information and encourage collaboration. I re-started animal facility talks at the MRC Prion Unit to encourage technicians



Robin's team shared their work on enrichment in Tech3Rs issue 10, including how they wrap treats in paper 'piñatas' to provide additional enrichment.

to present their work, and I was lucky to be involved with an NC3Rs seminar at UCL. I'm now proud to organise a yearly virtual event called "Species Month" with the IAT London Branch and to have recently joined IAT Council to sit on the Board of Education.

I have been fortunate enough to meet inspiring people in my career, but it only happened because I went out of my way to do so, to ask questions and to develop my knowledge. Within ten years, this has taken me from junior technician to facility manager. While advancing my career is great, the best thing is to be able to improve animal welfare for better science, as well as supporting my colleagues to do so too. Being an animal technician is a rewarding career, but you only get what you put in.

The IAT's collection of resources on mental health for technicians, "It's OK not to be OK", is available at www.iat.org.uk/equality.

To find out more about compassion fatigue, watch this previous NC3Rs/NA3RsC webinar: www.nc3rs.org.uk/compassionfatigue.

To find out more about refined mouse handling, including video tutorials and other useful resources, visit www.nc3rs.org.uk/mousehandling.

To find out more about single use of needles, please visit www.nc3rs.org.uk/needlereuse.

Rosie Payne's (University of Surrey) work on using different scents on wooden blocks to encourage gnawing was featured in Issue 10 of Tech3Rs: www.nc3rs.org.uk/tech3Rsissue10.

Upcoming events



CONGRESS

Congress 2022

IAT Congress 2022

Tuesday 29 March – Friday 1 April
Harrogate Convention Centre

The 2022 Congress of the Institute of Animal Technology (IAT) will be an in-person event. The programme includes workshops covering a range of topics, from promoting a culture of care and best practice in breeding laboratory mice through to environmental enrichment for zebrafish. This year's event will also feature poster presentations and a trade exhibition.

The NC3Rs will be running a workshop on managing aggression in laboratory animal species at 11:00 – 12:30 on Wednesday 30 and Thursday 31 March. Join us for tips on reducing and dealing with aggression in mice, rats, rabbits, dogs, pigs and macaques.

For more information and to register for the conference, visit eu.eventscloud.com/website/4554/.

Once registered, delegates will receive an email two to three weeks before the event inviting them to register for workshops on a first-come, first-served basis.

Happy birthday, 3 Minute 3Rs!

Every third Thursday of the month, the 3 Minute 3Rs podcast provides a summary of the latest research and news in 3Rs science and technology. Working with LabAnimal and the North American 3Rs Collaborative (NA3RsC), we cover three research papers in around a minute each, helping you stay up-to-date with the latest innovations in all three 'R's.

November 2021 marks the fourth birthday of the podcast. This month's episode will cover the three winning papers from

this year's AAALAC/IQ Global 3Rs Awards, while the October episode highlights 'people-focused' papers, with topics including the professional quality of life of staff in laboratory animal research, and how to improve the culture of care around using animals for scientific purposes.

Visit play.acast.com/s/3-minute-3rs to listen or subscribe to 3 Minute 3Rs, and to catch up on all our past episodes. You can also search for 3 Minute 3Rs in your favourite podcast app.

